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Atty's Docket No. MERCK-2033

Applicant(s) : Werner MEDERSKI et al.

For : QUINAZOLINONES

The Honorable Commissioner  
of Patents and Trademarks  
Washington, D.C. 20231

SUBMISSION OF APPLICATION UNDER 37 C.F.R. §1.53(f)

Sir:

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Pages of Application: Specification - 91  
Claims - 7  
Abstract - 1  
Sheets of Drawings - 0

NO DECLARATION IS ATTACHED.

Respectfully submitted,

MILLEN, WHITE, ZELANO & BRANIGAN, P.C.

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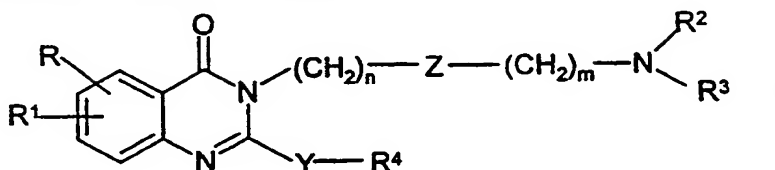
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## Quinazolinones

The invention relates to substituted quinazolinones of the formula I

5



in which

10

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,

15

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

Z may be absent and, if present, is phenylene,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

20

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>,

30

NHA,  $\text{NA}_2$ ,  $\text{NO}_2$ ,  $\text{SO}_2\text{NH}_2$ ,  $\text{SO}_2\text{NAH}$  or  $\text{SO}_2\text{NA}_2$  or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA,  $\text{CF}_3$ ,  $\text{OCF}_3$ , Hal, CN, COOH, COOA,  $\text{NH}_2$ , NHA,  $\text{NA}_2$ ,  $\text{NO}_2$ ,  $\text{SO}_2\text{NH}_2$ ,  $\text{SO}_2\text{NAH}$  or  $\text{SO}_2\text{NA}_2$

5 Hal is F, Cl, Br or I,  
n and m are each independently 0, 1, 2 or 3 and the sum of n and m is greater than 0,

with the proviso if Z and Y are absent and  $\text{R}^4$  is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl,  $\text{R}^1$  is not H or 8-Cl,  $\text{R}^2$  is not H, methyl or ethyl,  $\text{R}^3$  is not H, methyl or ethyl and the sum of n and m ( $= n+m$ ) is not 2 or 3,  
10 and

if Z and Y are absent,  $\text{R}^4$  is phenyl or 4-methoxyphenyl, R,  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  are H, then the sum of n and m ( $= n+m$ ) is not 2 or 3,  
and their pharmaceutically tolerable salts and solvates.

15 Similar compounds having a quinazolinone parent structure as a combinatorial library are disclosed in WO 98/11438. W.D. Dean et al, J. Het. Chem. 1982, 1117-24 and L. Legrand et al, Bull. Soc. Chim. Fr. 1976, 1853-6 describes methods for the synthesis of similar quinazolinone  
20 compounds.

The invention is based on the object of finding novel compounds having valuable properties, in particular those which can be used for the production of medicaments.

25 It has been found that the compounds of the formula I and their salts or solvates have very valuable pharmacological properties together with good tolerability.

They act especially as GPIbIX inhibitors, in particular inhibiting the interaction of this receptor with the ligand von Willebrand factor (vWF). This  
30 action can be demonstrated, for example, by a method which is described



by S. Meyer et al. in J. Biol. Chem. 1993, 268, 20555-20562. The activity of GPIbIX as an alpha-thrombin receptor (N.J. Greco, Biochemistry 1996, 35, 915-921) can also be blocked by the compounds mentioned.

5 The significance of GPIbIX as an adhesion receptor on platelets, which mediates the primary interaction of platelets with an arteriosclerotically modified vascular wall via binding to the vWF expressed there, has been described by many authors (e.g. Z.M. Ruggeri in Thromb. Hemost. 1997, 78, 611-616). The activation of another platelet adhesion receptor,  
10 GPIIb/IIIa, following the GPIbIX-vWF interaction, leads to platelet aggregation and thus to thrombotic vascular occlusion.

A GPIbIX antagonist can thus prevent the start of thrombus formation and thus also release of active substances from the platelets which, for  
15 example, promote thrombus growth and have an additional trophic action on the vascular wall. This has been shown with inhibitory peptides or antibodies in various experimental models (e.g. H Yamamoto et al., Thromb. Hemost. 1998, 79, 202-210).

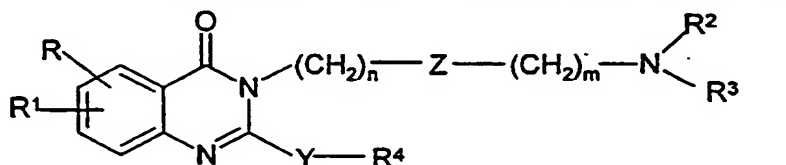
20 In the case of higher shear forces, the blocking action of GPIbIX inhibitors exerts its maximum effect, as described by J.J. Sixma et al. in Arteriosclerosis, Thrombosis, and Vascular Biology 1996, 16, 64-71. According to the flow chamber method used there, the compounds of the formula I can be characterized as GPIbIX inhibitors in whole blood.

25 The inhibition of thrombus formation of the GPIbIX inhibitors can be measured by a modified Born method (Nature 1962, 192, 927-929) using botrocetin or ristocetin as an aggregation stimulant.

30

The compounds of the formula I according to the invention can therefore be employed as pharmaceutical active compounds in human and veterinary medicine. They act as adhesion receptor antagonists, in particular as glycoprotein IbIX antagonists, and are suitable for the prophylaxis and/or therapy of thrombotic disorders and sequelae deriving therefrom. The preferentially best action is to be expected in the case of thrombotic disorders in the arterial vascular system, but GPIbIX inhibitors also have an effect in the case of thrombotic disorders in the venous vascular bed. The disorders include acute coronary syndromes, angina pectoris, myocardial infarct, peripheral circulatory disorders, stroke, transient ischaemic attacks, arteriosclerosis, reocclusion/restenosis after angioplasty/stent implantation. The compounds can furthermore be employed as anti-adhesive substances where the body comes into contact with foreign surfaces such as implants, catheters or cardiac pacemakers.

Therefore, the invention relates further to compounds of the formula I



in which

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

Z may be absent and, if present, is phenylene,

- A is unbranched or branched alkyl having 1 to 6 carbon atoms,  
 Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is  
 unsubstituted or mono-, di- or trisubstituted by A, OH, OA,  
 CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>,  
 5 SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,  
 Het is a saturated, partially or completely unsaturated mono- or  
 bicyclic heterocyclic radical having 5 to 10 ring members;  
 where 1 or 2 N and/or 1 or 2 S or O atoms can be present and  
 the heterocyclic radical can be mono- or disubstituted by A,  
 10 Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA,  
 phenyl which is unsubstituted or mono-, di- or trisubstituted by  
 by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>,  
 NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl  
 which is unsubstituted or mono-, di- or trisubstituted by A, OH,  
 15 OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>,  
 NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>  
 Hal is F, Cl, Br or I,  
 n is 0, 1, 2 or 3,  
 m is 0, 1, 2 or 3,  
 20 and their physiologically acceptable salts or solvates as pharmaceutical  
 active compounds.

The invention relates to compounds of the formula I according to Claim 4  
 and their physiologically acceptable salts or solvates as glycoprotein IbIX  
 25 antagonists.

Comparison medication introduced onto the market which may be  
 mentioned are aspirin and GPIIbIIIa antagonists.

30

5



10

**R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase.**

15 Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms.

A is unbranched or branched alkyl having 1 to 6 carbon atoms.

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is

20                    unsubstituted or mono-, di- or trisubstituted by A, OH, OA.

CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA, NO<sub>2</sub>

SO<sub>2</sub>-NH<sub>2</sub>, SO<sub>2</sub>-NAH or SO<sub>2</sub>-NA

is a saturated, partially aromatic, polyimide.

bicyclic heterocyclic radical having 5 to 10 ring members

25 where 1 or 2 N and/or 1 or 2 S or Q atoms can be present

the heterocyclic radical can be mono- or disubstituted by a

the heterocyclic radical can be mono- or disubstituted by A,

Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA,

phenyl which is unsubstituted or mono-, di- or trisubstituted by

by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>,

30 NHA,  $\text{NA}_2$ ,  $\text{NO}_2$ ,  $\text{SO}_2\text{NH}_2$ ,  $\text{SO}_3\text{NAH}$  or  $\text{SO}_3\text{NA}_2$  or thiophenyl

which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

Hal is F, Cl, Br or I,

5 n and m are each independently 0, 1, 2 or 3 and the sum of n and m is greater than 0,

with the proviso if Z and Y are absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,

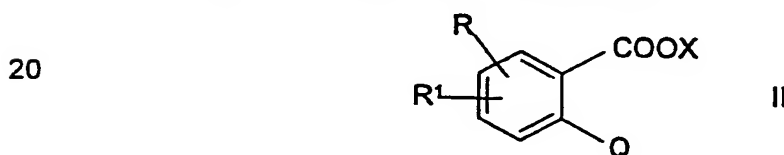
10 and

if Z and Y are absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl, R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,

and their pharmaceutically tolerable salts and solvates, characterized in that

15 a) a compound of the formula I is liberated from one of its functional derivatives by treating with a solvolysing or hydrogenolysing agent, or

b) in stage 1) a compound of the formula II

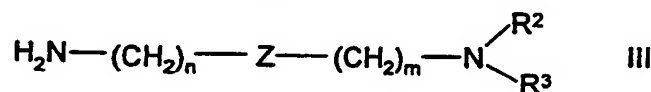


in which

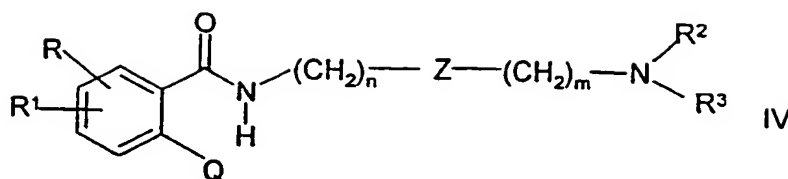
X is Cl, Br, OH or a reactive esterified OH group and

25 Q is NH<sub>2</sub>, NHA or a protected amino group,

is reacted with a compound of the formula III



30 in which R<sup>2</sup>, R<sup>3</sup>, Z, n and m have the meanings indicated in Claim 1, to give a compound of formula IV



5

and

in stage 2) a compound of formula IV as indicated above is if necessary deprotected to give a compound of formula IV in which Q is NH<sub>2</sub> or NHA and is reacted with a compound of formula V



10

in which R<sup>4</sup> and Y have the meanings indicated in Claim 1, or

c) a radical R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and/or R<sup>4</sup> is converted into another radical R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and/or R<sup>4</sup> by, for example

15

- converting an amino group into a guanidino group by reaction with an amidinating agent,
- reducing a nitro group, sulfonyl group or sulfoxyl group,
- etherifying an OH group or subjecting an OA group to ether cleavage,
- alkylating a primary or secondary amino group,
- partially or completely hydrolysing a CN group,
- cleaving an ester group or esterifying a carboxylic acid radical,
- reacting an aryl bromide, aryl iodide, heteroaryl bromide or heteroaryliodide to give the corresponding coupling products by means of a Suzuki coupling with boronic acids,
- or carrying out a nucleophilic or electrophilic substitution,

20

and/or

25

(e) a base or acid of the formula I is converted into one of its salts or solvates.

30

The compounds of the formula I can have a chiral centre and therefore occur in a number of stereoisomeric forms. All these forms (e.g. R and S forms) and their mixtures (e.g. the RS forms) are included in the formula I. They can be prepared conventionally.

- 5 The compounds according to the invention also include so-called prodrug derivatives, i.e. compounds of the formula I modified with, for example, alkyl or acyl groups, sugars or oligopeptides and which are rapidly cleaved in the body to give the active compounds according to the invention.
- 10 Furthermore, free amino groups as substituents of compounds of the formula I can be provided with appropriate conventional protective groups. Solvates of the compounds of the formula I are understood as meaning adducts of inert solvent molecules to the compounds of the formula I which are formed on account of their mutual power of attraction. Solvates are, for
- 15 example, mono- or dihydrates or alcoholates.

The proviso excludes the following compounds:

- 3-(2-Amino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-Amino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 20 3-(2-Amino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-Amino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-Methylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-Methylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-Methylamino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 25 3-(2-Methylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-Ethylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-Ethylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-Ethylamino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-Ethylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 30 3-(2-Dimethylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;

- 3-(2-Dimethylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Dimethylamino-propyl)-2-phenyl-3H-quinazolin-4-one;  
3-(2-Dimethylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Diethylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;  
5 3-(2-Diethylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Diethylamino-propyl)-2-phenyl-3H-quinazolin-4-one;  
3-(2-Diethylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Methylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Methylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
10 3-(2-Methylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Methylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Ethylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Ethylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Ethylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
15 3-(2-Ethylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Dimethylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Dimethylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Dimethylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Dimethylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
20 3-(2-Diethylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Diethylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Diethylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Diethylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Methylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
25 3-(2-Methylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Methylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Methylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-Ethylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-Ethylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
30 3-(2-Ethylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;



- 3-(2-Ethylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Dimethylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Dimethylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Dimethylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
 5 3-(2-Dimethylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Diethylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Diethylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Diethylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Diethylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
 10 3-(2-Methylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Methylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Methylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Methylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Ethylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
 15 3-(2-Ethylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Ethylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Ethylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Dimethylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Dimethylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
 20 3-(2-Dimethylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Dimethylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Diethylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
 3-(2-Diethylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
 3-(2-Diethylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one and  
 25 3-(2-Diethylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one.

The abbreviations used have the following meanings:

- BOC    tert-butoxycarbonyl,  
 CBZ    benzyloxycarbonyl,  
 30 DBU    1,8-diazabicyclo[5.4.0]undec-7-ene,

	DCC	dicyclohexylcarbodiimide,
	DCE	dichloroethane,
	DDQ	2,3-dichloro-5,6-dicyano-1,4-benzoquinone,
	DMA	dimethylacetamide,
5	DMF	dimethylformamide,
	dppf	1,1'-bis(diphenylphosphino)ferrocene,
	Et	ethyl,
	Fmoc	fluorenylmethoxycarbonyl,
10	HBTU	O-(benzotriazolyl)-N,N,N',N'-tetramethyluronium hexafluoro phosphate,
	Me	methyl,
	Mtr	4-methoxy-2,3,6-trimethylphenylsulfonyl,
	OBu	tert-butyl ester,
	OMe	methyl ester,
15	OEt	ethyl ester,
	POA	phenoxyacetyl,
	Ph	phenyl,
	TEA	triethylamine,
	TFA	trifluoroacetic acid.

20

In the above formulae, A is alkyl and has 1 to 6, preferably 1, 2, 3 or 4 C atoms. Alkyl is preferably methyl, furthermore ethyl, propyl, isopropyl, butyl, isobutyl, sec-butyl or tert-butyl, additionally also pentyl, 1-, 2- or 3-methylbutyl, 1,1-, 1,2- or 2,2-dimethylpropyl, 1-ethylpropyl, hexyl, 1-, 2-, 25 3- or 4-methylpentyl, 1,1-, 1,2-, 1,3-, 2,2-, 2,3- or 3,3-dimethylbutyl, 1- or 2-ethylbutyl, 1-ethyl-1-methylpropyl, 1-ethyl-2-methylpropyl, 1,1,2- or 1,2,2-trimethylpropyl.

A is preferentially methyl.

30

Alkenyl having 2 to 4 carbon atoms is preferably vinyl, allyl, 2- or 3-butenyl, isobutenyl or sec-butenyl; vinyl is particularly preferred.

5 Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>.

10 Ar is preferentially phenyl, preferably - as indicated - mono- di- or trisubstituted phenyl, specifically preferentially phenyl, 2-, 3- or 4-methylphenyl, 2-, 3- or 4-ethylphenyl, 2-, 3- or 4-propylphenyl, 2-, 3- or 4-isopropylphenyl, 2-, 3- or 4-tert-butylphenyl, 2-, 3- or 4-aminophenyl, 2-, 3- or 4-N,N-dimethylaminophenyl, 2-, 3- or 4-sulfonamidophenyl, 2-, 3- or 4-nitrophenyl, 2-, 3- or 4-hydroxyphenyl, 2-, 3- or 4-methoxyphenyl, 2-, 3- or 4-ethoxyphenyl, 2-, 3- or 4-trifluoromethylphenyl, 2-, 3- or 4-  
15 trifluoromethoxyphenyl, 2-, 3- or 4-carboxyphenyl, 2-, 3- or 4-cyanophenyl, 2-, 3- or 4-fluorophenyl, 2-, 3- or 4-chlorophenyl, 2-, 3- or 4-bromophenyl. Furthermore Ar is preferentially unsubstituted naphthyl, biphenyl or benzofuran-5-yl.

20 Phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl is  
25 particularly preferred for Ar.

Cycloalkyl preferably has 3-7 C atoms and is preferably cyclopropyl or cyclobutyl, furthermore preferably cyclopentyl or cyclohexyl, and further  
30 also cycloheptyl; cyclohexyl is particularly preferred.

Hal is preferably F, Cl or Br.

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1  
 5 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or  
 10 mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>.

Het is preferably substituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl  
 15 which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or unsubstituted 2- or 3-furyl, 2- or 3-thiophenyl, 1-, 2- or 3-pyrrolyl, 1-, 2-, 4- or 5-imidazolyl, 1-, 3-, 4- or 5-pyrazolyl, 2-, 4- or 5-oxazolyl, 3-, 4- or 5-isoxazolyl, 2-, 4- or 5-thiazolyl, 3-, 4- or  
 20 5-isothiazolyl, 2-, 3- or 4-pyridyl, 2-, 4-, 5- or 6-pyrimidinyl, furthermore preferably 1,2,3-triazol-1-, -4- or -5-yl, 1,2,4-triazol-1-, -4- or -5-yl, 1- or 5-tetrazolyl, 1,2,3-oxadiazol-4- or -5-yl, 1,2,4-oxadiazol-3- or -5-yl, 1,3,4-thiadiazol-2- or -5-yl, 1,2,4-thiadiazol-3- or -5-yl, 1,2,3-thiadiazol-4- or -5-yl, 2-, 3-, 4-, 5- or 6-2H-thiopyranyl, 2-, 3-  
 25 or 4-4H-thiopyranyl, 3- or 4-pyridazinyl, pyrazinyl, 2-, 3-, 4-, 5-, 6- or 7-benzofuryl, 2-, 3-, 4-, 5-, 6- or 7-benzothieryl, 1-, 2-, 3-, 4-, 5-, 6- or 7-1H-indolyl, 1-, 2-, 4- or 5-benzimidazolyl, 1-, 3-, 4-, 5-, 6- or 7-benzopyrazolyl, 2-, 4-, 5-, 6- or 7-benzoxazolyl, 3-, 4-, 5-, 6- or 7-benzisoxazolyl, 2-, 4-, 5-, 6- or 7-benzothiazolyl, 2-, 4-, 5-, 6- or  
 30 7-benzisothiazolyl, 4-, 5-, 6- or 7-benz-2,1,3-oxadiazolyl, 1-, 2-, 3-, 4-,

5-, 6-, 7- or 8-quinolinyl, 1-, 3-, 4-, 5-, 6-, 7- or 8-isoquinolinyl, 1-, 2-, 3-, 4- or 9-carbazolyl, 1-, 2-, 3-, 4-, 5-, 6-, 7-, 8- or 9-acridinyl, 3-, 4-, 5-, 6-, 7- or 8-cinnolinyl, 2-, 4-, 5-, 6-, 7- or 8-quinazolinyl. The heterocyclic radicals can also be partially or completely hydrogenated. Het

5 can thus also be 2,3-dihydro-2-, -3-, -4- or -5-furyl, 2,5-dihydro-2-, -3-, -4- or -5-furyl, tetrahydro-2- or -3-furyl, 1,3-dioxolan-4-yl, tetrahydro-2- or -3-thienyl, 2,3-dihydro-1-, -2-, -3-, -4- or -5-pyrrolyl, 2,5-dihydro-1-, -2-, -3-, -4- or -5-pyrrolyl, 1-, 2- or 3-pyrrolidinyl, tetrahydro-1-, -2- or -3-pyrrolyl, tetrahydro-1-, -2- or

10 4-imidazolyl, 2,3-dihydro-1-, -2-, -3-, -4-, -5-, -6-, -7-1H-indolyl, 2,3-dihydro-1-, -2-, -3-, -4- or -5-pyrazolyl, tetrahydro-1-, -3- or -4-pyrazolyl, 1,4-dihydro-1-, -2-, -3- or -4-pyridyl, 1,2,3,4-tetrahydro-1-, -2-, -3-, -4-, -5- or -6-pyridyl, 1,2,3,6-tetrahydro-1-, -2-, -3-, -4-, -5- or -6-pyridyl, 1-, 2-, 3- or

15 4-piperidinyl, 1-, 2-, 3- or 4-azepanyl, 2-, 3- or 4-morpholinyl, tetrahydro-2-, -3- or -4-pyranyl, 1,4-dioxanyl, 1,3-dioxan-2-, -4- or -5-yl, hexahydro-1-, -3- or -4-pyridazinyl, hexahydro-1-, -2-, -4- or -5-pyrimidinyl, 1-, 2- or 3-piperazinyl, 1,2,3,4-tetrahydro-1-, -2-, -3-, -4-, -5-, -6-, -7- or -8-quinolinyl, 1,2,3,4-tetrahydro-1-, -2-, -3-,

20 -4-, -5-, -6-, -7- or -8-isoquinolinyl.

2-Furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl is particularly preferred for Het.

25 Phenylalkyl preferably has 7, 8, 9 or 10 carbon atoms and is preferably phenylmethyl, phenylethyl, phenylpropyl or phenylbutyl; phenylethyl is particularly preferred.

30 The term solid phase indicates a resin for solid-phase chemistry, especially for combinatorial chemistry, i.e. by robot- and computer-assisted

syntheses, and subjected to mass screening as indicated in US 5,463,564; M. A. Gallop et al., J. Med. Chem. 1994, 37, 1233-1251 and 1385-1401 and M.J. Sofia, Drugs Discovery Today 1996, 1, 27-34). The polymeric material of the solid phase is generally chosen from the group consisting of

5 cross-linked polystyrene, cross-linked polyacrylamide or other resins, natural polymers or silicagels.

The group of cross-linked polystyrene, cross-linked polyacrylamide or other resins includes e.g. polyacrylamide, polymethacrylamide,

10 polyhydroxyethylmethacrylate, polyamide, polystyrene, (meth)acrylate copolymers, for instance from (meth)acrylic acid, esters of (meth)acrylic acid and/or 2-methylene-succinic acid, but-2-enoic acid or maleic acid, polyurethanes or other copolymers.

15 Suitable terminal functional groups or linkers on the surface of the resin are chosen to attach the compounds to the resin. There exists a variety of commercially available resins, e.g. in Novabiochem - The Combinatorial Chemistry Catalog, March 99. Examples for suitable resins are carbonate resins with a modified carbonate group as terminal functional

20 group like p-nitrophenylcarbonate resin, halogenated resins like Merrifield resin (chloromethylpolystyrene) or carboxy resins like carboxy polystyrene resin or NovaSyn® TG Carboxy Resin. p-Nitrophenylcarbonate resin is particularly preferred. These and other types of resins well known in the art can be used in the subject invention.

25

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A, where A, Ar, Hal have a preferred meaning indicated beforehand and R<sup>2</sup> have a preferred meaning indicated in the following.

30

R is preferentially H.

R<sup>1</sup> is preferentially H, A, OA or Hal.

The preferred position of R<sup>1</sup> is the 6- or 7-position of the quinazolinone ring system.

5

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase, where A or solid phase have a preferred meaning indicated beforehand.

10

R<sup>2</sup> is preferentially H.

R<sup>3</sup> is preferentially H or -C(=NH)-NH<sub>2</sub>, particularly preferred is H.

15

R<sup>4</sup> is Ar, phenylalkyl, cycloalkyl or Het, where Ar, phenylalkyl, cycloalkyl or Het have a preferred meaning indicated beforehand. R<sup>4</sup> is preferentially

phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl, phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl.

20

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms. Y is preferentially absent or vinyl.

25

Z may be absent and, if present, is phenylene.

n and m are each independently of each other 0, 1, 2 or 3, particularly preferred 1.

30

Some preferred groups of compounds can be expressed by the following subformulae Ia to Iv, which correspond to the formula I and in which the radicals not designated in greater detail have the meanings indicated in formula I, but in which

5

in Ia R is H and  
R' is H, A, OA or Hal;

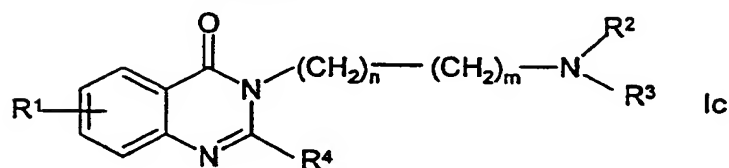
10

in Ib R is H,  
R' is H, A, OA or Hal and  
Y is absent;

15

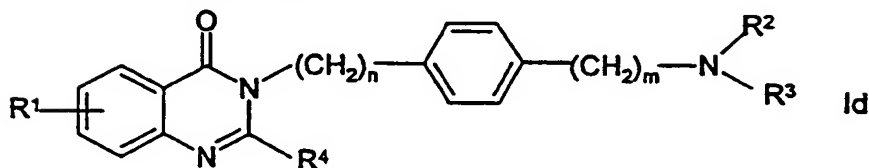
in Ic R is H,  
R' is H, A, OA or Hal,  
Y is absent and  
Z is absent;

20



25

in Id R is H,  
R' is H, A, OA or Hal,  
Y is absent and  
Z is phenylene;



30

in Ie R is H,





R<sup>2</sup> is H and

R<sup>4</sup> is Het;

- 5            in lo    R    is H,  
              R<sup>1</sup>    is H, A, OA or Hal,  
              R<sup>2</sup>    is H,  
              R<sup>3</sup>    is H,  
              R<sup>4</sup>    is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-  
                  tert-butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-  
 10                    methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-  
                          dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxy-  
                          biphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl,  
                          naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl,  
                          phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl,  
 15                    5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,  
                          Z    is absent,  
                          n    is 1 and  
                          m    is 1;
- 20            in lp    R    is H,  
              R<sup>1</sup>    is H, A, OA or Hal,  
              R<sup>2</sup>    is H,  
              R<sup>3</sup>    is H,  
              R<sup>4</sup>    is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-  
 25                    tert-butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-  
                          methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-  
                          dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxy-  
                          biphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl,  
                          naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl,  
 30

phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,

**Z** is phenylene,

**n is 1 and**

5 m is 1;

in lq R is H,

**R<sup>1</sup> is H, A, OA or Hal.**

 $R^2$  is H,

10  $R^3$  is  $H_1$ .

Y is  $-\text{CH}=\text{CH}-$ .

**R<sup>4</sup>** is phenyl, 4-dimethylaminophenyl or 2,5-dimethoxyphenyl,

**Z** is absent.

$n$  is 1 and

15 m is 1:

in Ir  $R$  is  $H$ ,

**R<sup>1</sup> is H, A, OA or Hal,**

 $R^2$  is  $H_1$ 

20  $R^3$  is H,

Y is  $-\text{CH}=\text{CH}-$ .

**R<sup>4</sup>** is phenyl, 4-dimethylaminophenyl or 2,5-dimethoxyphenyl,

**Z** is phenylene,

**n is 1 and**

25                      m    is 1;

in Is R is H,

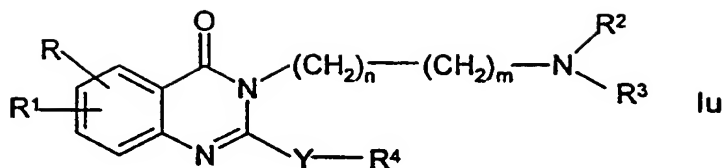
**R<sup>1</sup> is H, A, OA or Hal,**

 $R^2$  is  $H_1$ 

30  $R^3$  is H.

- Y is absent,
- 5 R<sup>4</sup> is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 3',5'-dimethoxybiphenyl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl, phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,
- 10 Z is absent,  
n is 1 and  
m is 1;
- in It
- 15 R is H,  
R<sup>1</sup> is H, A, OA or Hal,  
R<sup>2</sup> is H,  
R<sup>3</sup> is H,  
Y is absent,  
R<sup>4</sup> is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl, phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,
- 20 Z is phenylene,  
n is 1 and  
m is 1;
- 25
- 30

in Iu



5

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,

10

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

15

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

20

25

30

Hal is F, Cl, Br or I,

n and m are each independently 0, 1, 2 or 3 and the sum of n and m is greater than 0,

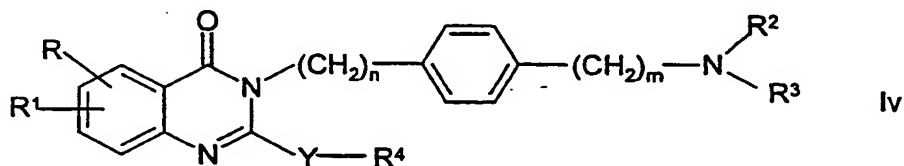
with the proviso if Y is absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,

and

if Y is absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl, R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,

and their pharmaceutically tolerable salts and solvates;

in Iv



R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members,

where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

Hal is F, Cl, Br or I,  
n and m are each independently 0, 1, 2 or 3 and the sum of n and m is greater than 0,

and their pharmaceutically tolerable salts and solvates.

The compounds of the formula I and also the starting substances for their preparation are otherwise prepared by methods known per se, such as are described in the literature (e.g. in the standard works such as Houben-Weyl, Methoden der organischen Chemie [Methods of Organic Chemistry], Georg-Thieme-Verlag, Stuttgart), namely under reaction conditions which are known and suitable for the reactions mentioned. In this case, use can also be made of variants which are known per se, but not mentioned here in greater detail.

The starting substances, if desired, can also be formed in situ such that they are not isolated from the reaction mixture, but immediately reacted further to give the compounds of the formula I.

The compounds of the formula I can be obtained by liberating them from their functional derivatives by solvolysis, in particular hydrolysis or by hydrogenolysis.

- Preferred starting substances for the solvolysis or hydrogenolysis are those which otherwise correspond to the formula I, but instead of one or more free amino and/or hydroxyl groups contain corresponding protected amino and/or hydroxyl groups, in particular those which instead of an H-N- group carry an R'-N- group, in which R' is an amino protective group and/or those which instead of the H atom of a hydroxyl group carry a hydroxyl protective group, e.g. those which correspond to the formula I, but instead of a group -COOH carry a group -COOR", in which R" is a hydroxyl protective group.
- 10 A number of - identical or different - protected amino and/or hydroxyl groups can also be present in the molecule of the starting substance. If the protective groups present are different from one another, in many cases they can be removed selectively (lit.: T.W. Greene, P.G.M. Wuts, *Protective Groups in Organic Chemistry*, 2nd ed., Wiley, New York-1991, P.J. Kocienski, *Protecting Groups*, 1st ed., Georg Thieme Verlag, Stuttgart - New-York, 1994 or H. Kunz, H. Waldmann in *Comprehensive Organic Synthesis*, vol. 6 (ed. B.M. Trost, I. Fleming, E. Winterfeldt), Pergamon, Oxford, 1991, p. 631-701).
- 20 The expression "amino protective group" is generally known and relates to groups which are suitable for protecting (for blocking) an amino group against chemical reactions, but which are easily removable after the desired chemical reaction has been carried out at other positions in the molecule. Typical groups of this type are, in particular, unsubstituted or substituted acyl, aryl, aralkoxymethyl or aralkyl groups. Since the amino protective groups are removed after the desired reaction (or reaction sequence), their nature and size is otherwise not critical; however, those having 1-20, in particular 1-8, -C atoms are preferred. The expression "acyl group" is to be interpreted in the widest sense in connection with the present process. It includes acyl groups derived from aliphatic, araliphatic,



- aromatic or heterocyclic carboxylic acids or sulfonic acids and, in particular, alkoxy carbonyl groups, aryloxy carbonyl groups and especially aralkoxy carbonyl groups. Examples of acyl groups of this type are alkanoyl such as acetyl, propionyl, butyryl; aralkanoyl such as phenylacetyl; aroyl such as benzoyl or toluyl; aryloxyalkanoyl such as POA; alkoxy carbonyl such as methoxycarbonyl, ethoxycarbonyl, 2,2,2-trichloroethoxycarbonyl, BOC, 2-iodoethoxycarbonyl; aralkyloxy carbonyl such as CBZ ("carbobenzoxy"), 4-methoxybenzyloxy carbonyl (MOZ), 4-Nitrobenzyloxy carbonyl oder 9-fluorenylmethoxycarbonyl (Fmoc); 2-(phenylsulfonyl)ethoxycarbonyl; trimethylsilylethoxycarbonyl (Teoc) or arylsulfonyl such as 4-methoxy-2,3,6-trimethylphenyl-sulfonyl (Mtr). Preferred amino protective groups are BOC, furthermore CBZ, Fmoc, benzyl and acetyl; particularly preferred Fmoc.
- The expression "hydroxyl protective group" is also generally known and relates to groups which are suitable for protecting a hydroxyl group against chemical reactions, but which are easily removable after the desired chemical reaction has been carried out at other positions in the molecule.
- Typical groups of this type are the abovementioned unsubstituted or substituted aryl, aralkyl, aroyl or acyl groups, furthermore also alkyl groups, alkyl-, aryl- or aralkylsilyl groups or O,O- or O,S-acetals. The nature and size of the hydroxyl protective groups is not critical, since they are removed again after the desired chemical reaction or reaction sequence; groups having 1-20, in particular 1-10 C atoms, are preferred. Examples of hydroxyl protective groups are, inter alia, benzyl, 4-methoxybenzyl oder 2,4-dimethoxybenzyl, aroyl groups such as benzoyl or p-nitrobenzoyl, acyl groups such as acetyl or pivaloyl, p-toluolsulfonyl, alkyl groups such as methyl or tert-butyl, but also allyl, alkylsilyl groups such as trimethylsilyl (TMS), triisopropylsilyl (TIPS), tert-butyldimethylsilyl (TBS) or triethylsilyl,

trimethylsilylethyl, aralkylsilyl groups such as tert-butyldiphenylsilyl (TBDPS), cyclic acetals such as isopropylidene-, cyclopentylidene-, cyclohexylidene-, benzylidene-, p-methoxybenzylidene- or o,p-dimethoxybenzylideneacetal, acyclic acetals such as tetrahydropyranyl (Thp), methoxymethyl (MOM), methoxyethoxymethyl (MEM), benzyloxymethyl (BOM) or methylthiomethyl (MTM). Acetyl, benzyl, tert-butyl or TBS being particularly preferred.

The liberation of the compounds of the formula I from their functional derivatives depending on the protective group used is known in the present literature such as T.W. Greene, P.G.M. Wuts, *Protective Groups in Organic Chemistry*, 2nd ed., Wiley, New York 1991, P.J. Kocienski, *Protecting Groups*, 1st ed., Georg Thieme Verlag, Stuttgart - New-York, 1994. In this case, use can also be made of variants which are known per se, but not mentioned here in greater detail.

The groups BOC and O-tert-butyl can preferably be removed, for example, using TFA in dichloromethane or using approximately 3 to 5N HCl in dioxane at 15-30°C, the Fmoc group using an approximately 5 to 50% solution of dimethylamine, diethylamine or piperidine in DMF at 15-30°C.

Preferred starting substances for the solvolysis or hydrogenolysis includes also those which otherwise correspond to the formula I, but are attached to a solid phase. The liberation of the compounds of the formula I from the solid phase is known in the present literature such as Novabiochem - The Combinatorial Chemistry Catalog, March 99 and cited literature.

The solid phase with a carbonate moiety as terminal functional group can preferably be removed, for example, using TFA (50%) in dichloromethane.

The quinazolinones of formula I can also preferably be prepared, using either solution or solid-phase techniques, by combining and reacting an anthranilic acid of formula II with an amine of formula III and if necessary deprotect the given formula IV in which Q is then  $\text{NH}_2$  or NHA and reacting the compound of formula IV in which Q is  $\text{NH}_2$  or NHA with an aldehyde of formula V.

As a rule, the starting compounds of the formulae II, III and V are known or commercially available.

The unknown compounds, however, can be prepared by methods known per se. The compounds of the formula II are anthranilic acids. It is furthermore possible to introduce appropriate substituents into the aromatic by conventional electrophilic or alternatively nucleophilic substitutions. Examples of Fmoc protected anthranilic acids, include, but are not limited to, Fmoc protected anthranilic acid, Fmoc protected 3-methyl anthranilic acid, Fmoc protected 3-methoxy anthranilic acid, Fmoc protected 3-chloro anthranilic acid or Fmoc protected 4-chloro anthranilic acid.

Solid-phase techniques may be employed to condense anthranilic acids of formula II and the amine component of formula III which is resin bound ( $\text{R}^2$  or  $\text{R}^3$  is solid phase).

The amines of formula III in which  $\text{R}^2$  or  $\text{R}^3$  are H, as a rule, are also commercially available and can be attached to the suitable resin by coupling procedures well known in the art and as described in the ensuing Examples. Furthermore, syntheses for the preparation of amines of formula III, such as, for example, the Gabriel synthesis, can be used.

The aldehydes of formula V, as a rule, are also commercially available. Furthermore, syntheses for the preparation of aldehydes of formula V, such as, for example, the oxidation of an alcohol, can be used.

As a rule, the reactions and the attachment to the resin are carried out in an inert solvent. Depending on the conditions used, the reaction time is between a few minutes and a number of days, the reaction temperature  
5 between approximately 0° and 150°C, normally between 20° and 130°C. Suitable inert solvents are, for example, hydrocarbons such as hexane, petroleum ether, benzene, toluene or xylene; chlorinated hydrocarbons such as trichloroethylene, 1,2-dichloroethane, carbon tetrachloride, chloroform or dichloromethane; alcohols such as methanol, ethanol,  
10 isopropanol, n-propanol, n-butanol or tert-butanol; ethers such as diethyl ether, diisopropyl ether, tetrahydrofuran (THF) or dioxane; glycol ethers such as ethylene glycol monomethyl or monoethyl ether (methyl glycol or ethyl glycol), ethylene glycol dimethyl ether (diglyme); ketones such as acetone or butanone; amides such as acetamide, N-methylpyrrolidone  
15 (NMP), dimethylacetamide or dimethylformamide (DMF); nitriles such as acetonitrile; sulfoxides such as dimethyl sulfoxide (DMSO); carbon disulfide; carboxylic acids such as formic acid or acetic acid; nitro compounds such as nitromethane or nitrobenzene; esters such as ethyl acetate or mixtures of the solvents mentioned.

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The reaction of the compounds of formula II with compounds of formula III is analogously to the coupling of peptides. The condensation reaction of formula II with formula III is preferably carried out in an inert solvent as indicated above in the presence of a dehydrating agent, such as,  
25 dicyclohexylcarbodiimide (DCC), N-(3-dimethylaminopropyl)-N'-ethylcarbodiimide-hydrochlorid (EDC) or diisopropylcarbodiimide (DIC), further for instance in the presence of an anhydride of propanphosphonic acid (see Angew. Chem. 1980, 92, 129), diphenylphosphorylazide or 2-ethoxy-N-ethoxycarbonyl-1,2-dihydroquinoline.

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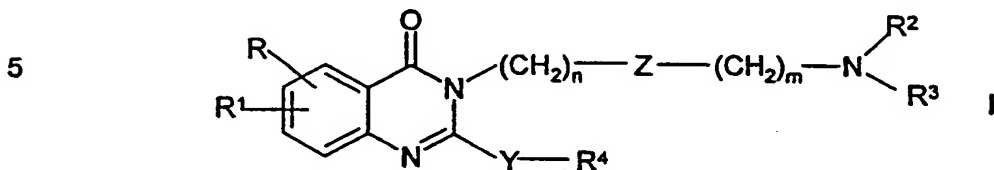
or solvent mixture, e.g. DMF or 1,4-dioxane at temperatures between 0° and 150°, preferably between 60° and 120°. Depending on the conditions used, the reaction time is between a few minutes and a number of days.

5 The boronic acid derivatives can be prepared by conventional methods or are commercially available. The reactions can be carried out in analogy to the methods indicated in Suzuki et al., J. Am. Chem. Soc. 1989, 111, 314ff., Suzuki et al., Chem. Rev. 1995, 95, 2457ff and G.C. Fu et al. Angew. Chem 1998, 110, 3586.

10 A base of the formula I can be converted into the associated acid addition salt using an acid, for example by reaction of equivalent amounts of the base and of the acid in an inert solvent such as ethanol and subsequent evaporation. Acids which give physiologically-acceptable salts are particularly suitable for this reaction. Thus inorganic acids can be used, e.g.  
15 sulfuric acid, nitric acid, hydrohalic acids such as hydrochloric acid or hydrobromic acid, phosphoric acids such as orthophosphoric acid, sulfamic acid, furthermore organic acids, in particular aliphatic, alicyclic, araliphatic, aromatic or heterocyclic mono- or polybasic carboxylic, sulfonic or sulfuric acids, e.g. formic acid, acetic acid, propionic acid, pivalic acid, diethylacetic  
20 acid, malonic acid, succinic acid, pimelic acid, fumaric acid, maleic acid, lactic acid, tartaric acid, malic acid, citric acid, gluconic acid, ascorbic acid, nicotinic acid, isonicotinic acid, methane- or ethanesulfonic acid, p-toluenesulfonic acid, naphthalenemono- and disulfonic acids or laurylsulfuric acid. Salts with physiologically unacceptable acids, e.g.  
25 picrates, can be used for the isolation and/or purification of the compounds of the formula I.

On the other hand, compounds of the formula I with bases (e.g sodium or potassium hydroxide or carbonate) can be converted into the corresponding metal salts, in particular alkali metal or alkaline earth metal  
30 salts, or into the corresponding ammonium salts.

The invention furthermore relates to pharmaceutical preparations comprising at least one compound of the formula I



in which

10 R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

15 Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

Z may be absent and, if present, is phenylene,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

20 Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

25 Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl

30

which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

Hal is F, Cl, Br or I,

5 n is 0, 1, 2 or 3,

m is 0, 1, 2 or 3,

and/or one of its physiologically acceptable salts, which are prepared, in particular, in an non-chemical way. In this case, the compounds of the formula I according to Claim 4 can be brought into a suitable dose form together with at least one solid, liquid and/or semi-liquid excipient or auxiliary and, if appropriate, in combination with one or more other active compounds.

These preparations can be used as medicaments in human or veterinary medicine. Possible excipients are organic or inorganic substances which are suitable for enteral (e.g. oral) or parenteral administration or topical application and do not react with the novel compounds, for example water, vegetable oils, benzyl alcohols, alkylene glycols, polyethylene glycols, glyceryl triacetate, gelatin, carbohydrates such as lactose or starch, magnesium stearate, talc and petroleum jelly. Tablets, pills, coated tablets, capsules, powders, granules, syrups, juices or drops are used, in particular, for oral administration, suppositories are used for rectal administration, solutions, preferably oily or aqueous solutions, furthermore suspensions, emulsions or implants, are used for parenteral administration, and ointments, creams or powders are used for topical application. The novel compounds can also be lyophilized and the lyophilizates obtained used, for example, for the production of injection preparations. The preparations indicated can be sterilized and/or can contain auxiliaries such as lubricants, preservatives, stabilizers and/or wetting agents, emulsifiers, salts for

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affecting the osmotic pressure, buffer substances, colorants, flavorings and/or one or more other active compounds, e.g. one or more vitamins.

5 The compounds of the formula I and their physiologically acceptable salts act as adhesion receptor antagonists, in particular glycoprotein IbIX antagonists, and can be employed for the prophylaxis and/or therapy of thrombotic disorders and sequelae deriving therefrom. The disorders are acute coronary syndromes, angina pectoris, myocardial infarct, peripheral circulatory disorders, stroke, transient ischaemic attacks, arteriosclerosis and reocclusion/restenosis after angioplasty/stent implantation.

10 In this case, the substances according to the invention are as a rule administered in the dose of the glycoprotein IIbIIIa antagonist ReoPro® of preferably between approximately 1 and 500 mg, in particular between 5 and 100 mg, per dose unit. The daily dose is preferably between approximately 0.02 and 10 mg/kg of body weight. The specific dose for each patient depends, however, on all sorts of factors, for example on the efficacy of the specific compound employed, on the age, body weight, general state of health and sex, on the diet, on the time and route of administration, and on the excretion rate, pharmaceutical combination and severity of the particular disorder to which the therapy applies. Oral administration is preferred.

25 Above and below, all temperatures are indicated in °C. In the following examples, "customary working-up" for solution reactions means: if necessary, water is added, if necessary, depending on the constitution of the final product, the mixture is adjusted to pHs between 2 and 10 and extracted with ethyl acetate or dichloromethane, the organic phase is separated off, dried over sodium sulfate and evaporated, and the residue is purified by chromatography on silica gel and/or by crystallization.

"Customary working-up" for solid-phase reactions means: the crude reaction is filtered and washed with DMF twice, then successively with methanol and methylene chloride three times, and finally once with methyl tert-butyl ether. The resin is then dried in vacuo.

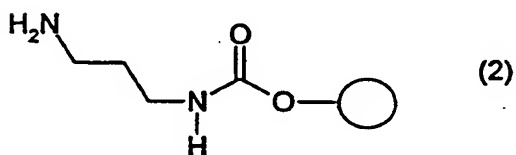
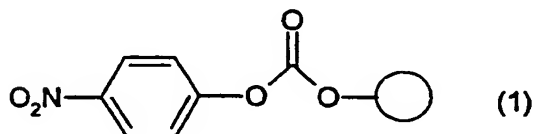
Mass spectrometry (MS) apparatuses Kratos Maldi III and Finnigan LCQ. (M+H)<sup>+</sup> or M<sup>+</sup> values are determined.

The entire disclosure of all applications, patents and publications cited above and below is hereby incorporated by reference.

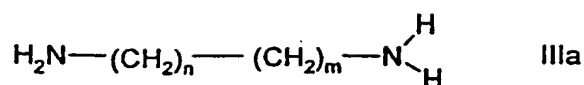
### EXAMPLES

#### Example 1:

3 grams (1.62 mmol) of p-nitrophenylcarbonate resin (1) [Novabiochem: 0.54 mmol/g loading) is suspended in 30 ml of DMF then 8.1 mmol of propane-1,3-diamine is added at room temperature. The reaction is then heated to 55° and left to stir for two days. The crude reaction is then customary worked up for solid-phase reactions affording the resin bound bis amine (2).



Analogously, by reaction of the p-nitrophenylcarbonate resin (1) with the bis amines of formula IIIa in which Z is absent, R<sup>2</sup> and R<sup>3</sup> are H and n and m has the meanings indicated in Claim 1, excluding propane-1,3-diamine,



the following resin bound bis amines are obtained:

methanediamine, resin bound;

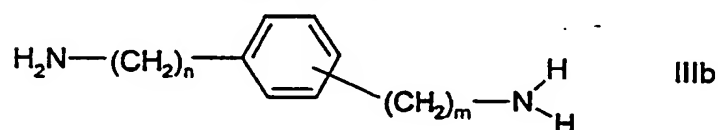
5 ethane-1,2-diamine, resin bound;

butane-1,4-diamine, resin bound;

pentane-1,5-diamine, resin bound and

hexane-1,6-diamine, resin bound.

10 Analogously, by reaction of the p-nitrophenylcarbonate resin (1) with the bis amines of formula IIIb in which Z is phenylene, R<sup>2</sup> and R<sup>3</sup> are H and n and m has the meanings indicated in Claim 1,



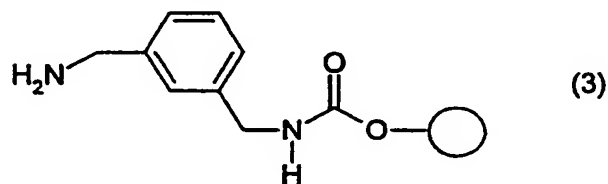
the following resin bound bis amines are obtained:

3-aminomethyl-phenylamine, resin bound;

3-aminoethyl-phenylamine, resin bound;

3-aminopropyl-phenylamine, resin bound;

20 3-aminomethyl-benzylamine, resin (3)



25 3-aminoethyl-benzylamine, resin bound;

3-aminopropyl-benzylamine, resin bound;

2-[3-(2-aminoethyl)-phenyl]-ethylamine, resin bound;

3-[3-(3-aminopropyl)-phenyl]-propylamine, resin bound;

30 4-aminomethyl-phenylamine, resin bound;

4-aminoethyl-phenylamine, resin bound;

- 4-aminopropyl-phenylamine, resin bound;  
4-aminomethyl-benzylamine, resin bound;  
4-aminoethyl-benzylamine, resin bound;  
4-aminopropyl-benzylamine, resin bound;  
5 2-[4-(2-aminoethyl)-phenyl]-ethylamine, resin bound and  
3-[4-(3-aminopropyl)-phenyl]-propylamine, resin bound.

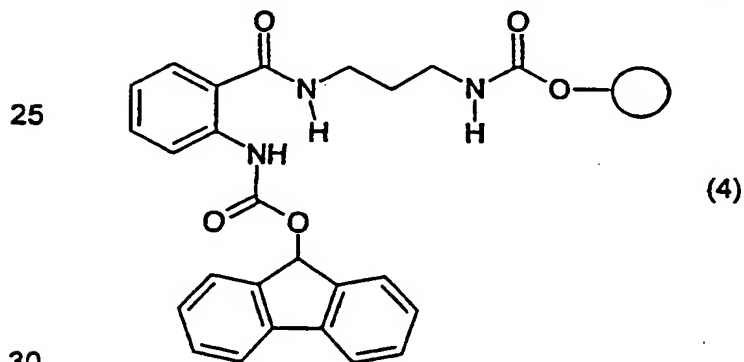
Example 2:

1. *Synthesis of Fmoc protected anthranilic acid*

- 10 29.15 mmol of anthranilic acid is taken in 100 ml of 1,4 dioxane then 145  
mmol of sodium bicarbonate in 20 ml of water is added. Next, 32 mmol of  
Fmoc-Cl is added and the reaction is left to stir overnight at room  
temperature. The reaction is then concentrated in vacuo and customary  
worked up for solution reactions. The resulting solid is triturated in ethyl  
15 ether affording the pure product.

2. *Coupling of Fmoc protected anthranilic acid to resin*

- 1 gram of resin (2) is suspended in 10 ml of DMF. The reaction is then  
treated with 1.62 mmol of Fmoc protected anthranilic acid, 1.62 mmol of  
20 HBTU, and 1.62 mmol of triethyl amine. The reaction is then allowed to  
shake overnight at room temperature. After customary working up, the  
resin is dried in vacuo affording resin bound anthranilic acid (4).



### 3. Cleavage of Fmoc protected group

1 gram resin (4) is suspended in 10 ml of 20% piperidine/DMF and shaken for 1.5 hours at room temperature. The reaction is then customary worked up for solid-phase reactions affording the free aniline (5).

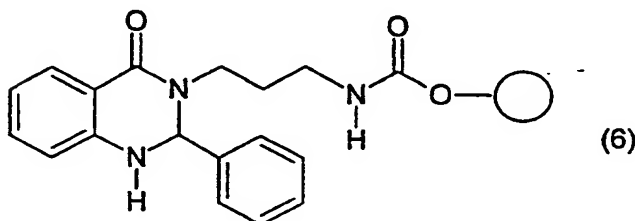
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### 4. Aldehyde condensation and ring closure

100 mg resin (5) is suspended in 1 ml of dimethyl acetamide then 200  $\mu$ l of acetic acid is added followed by the addition of 2.16 mmol of benzaldehyde. The reaction is then heated to 80° for two days. The reaction is then cooled to room temperature and customary worked up for solid-phase reactions affording the resin (6).

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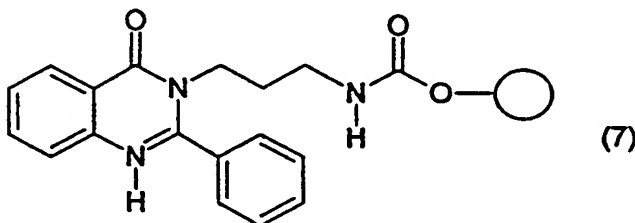


### 5. Oxidation to quinazolinone

100 mg resin (6) is suspended in 4 ml solution of 36 mg of DDQ in DMF. Then the reaction is allowed to shake overnight at room temperature. The reaction is then customary worked up for solid-phase reactions affording quinazolinone (7) resin bound.

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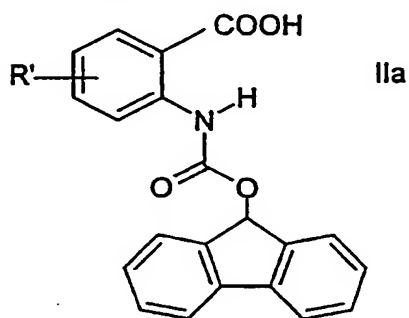
6. *Cleavage of the final product 3-(3-aminopropyl)-2-phenyl-3H-quinazolin-4-one*

100 mg of resin (7) is suspended in 2 ml of a 50% trifluoroacetic acid/methylen chloride solution and shaken for 1.5 hours at room temperature. Customary working up for solid-phase reactions afforded 3-(3-aminopropyl)-2-phenyl-3H-quinazolin-4-one;

MS calc.: 279.3 found: 280.1.

Example 3:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa



cleavage of the Fmoc protecting group and reaction with benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;

MS calc.: 313.8 found: 314.0;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-phenyl-3H-quinazolin-4-one;

MS calc.: 293.4 found: 294.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-phenyl-3H-quinazolin-4-one;

MS calc.: 313.8 found: 314.0;

5 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-phenyl-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.1.

10 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 2-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

15 3-(3-aminopropyl)-6-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8 found: 328.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(2-methylphenyl)-3H-quinazolin-4-one;

20 MS calc.: 307.4 found: 308.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8 found: 328.0;

25

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 323.4 found: 324.1;

30 with R' = H in formula IIa

3-(3-aminopropyl)-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 293.4 found: 394.1.

5 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

10 3-(3-aminopropyl)-6-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8;

with R' = 3-CH<sub>3</sub> in formula IIa

15 3-(3-aminopropyl)-6-methyl-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 307.4 found: 309.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8 found: 328.0;

20

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 323.4 found: 325.1;

25

with R' = H in formula IIa

3-(3-aminopropyl)-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 293.4 found: 394.1.

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Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-



methyI-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 5     3-(3-aminopropyl)-6-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;  
MS     calc.: 327.8;

with R' = 3-CH<sub>3</sub> in formula IIa

- 10     3-(3-aminopropyl)-6-methyl-2-(4-methylphenyl)-3H-quinazolin-4-one;  
MS     calc.: 307.4 found: 308.1;

with R' = 4-Cl in formula IIa

- 15     3-(3-aminopropyl)-7-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;  
MS     calc.: 327.8;

with R' = 3-OCH<sub>3</sub> in formula IIa

- 20     3-(3-aminopropyl)-6-methoxy-2-(4-methylphenyl)-3H-quinazolin-4-one;  
MS     calc.: 323.4 found: 324.1;

with R' = H in formula IIa

- 25     3-(3-aminopropyl)-2-(4-methylphenyl)-3H-quinazolin-4-one;  
MS     calc.: 293.4 found: 394.1.

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-tert-butyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 30     3-(3-aminopropyl)-6-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.9 found: 370.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

5 MS calc.: 349.5 found: 350.2;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

10 MS calc.: 369.9 found: 370.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 365.5 found: 366.2;

15 with R' = H in formula IIa

3-(3-aminopropyl)-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 335.5 found: 336.1.

20 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-chloro-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

25 3-(3-aminopropyl)-6-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 348.2 found: 348.0;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(3-chlorophenyl)-3H-quinazolin-4-one;

30 MS calc.: 307.4 found: 308.1;

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with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 348.2 found: 348.0;

5

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 343.8 found: 344.1;

10

with R' = H in formula IIa

3-(3-aminopropyl)-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 313.8 found: 316.1.

Analogously to example 2, by reaction of resin (2) with a compound of

15

formula IIa, cleavage of the Fmoc protecting group and reaction with 4-methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

20

3-(3-aminopropyl)-6-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8 found: 344.0;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

25

MS calc.: 323.4 found: 324.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8 found: 344.0;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 339.4 found: 340.1;

5 with R' = H in formula IIa

3-(3-aminopropyl)-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.1.

10 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

15 3-(3-aminopropyl)-6-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8;

with R' = 3-CH<sub>3</sub> in formula IIa

20 3-(3-aminopropyl)-6-methyl-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 323.4;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8;

25

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 339.4 found: 340.1;

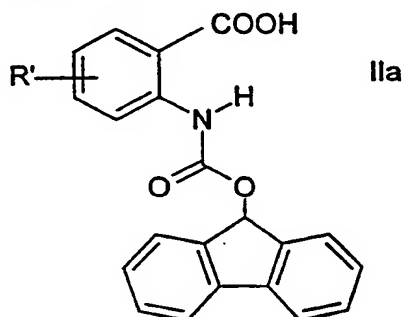
30 with R' = H in formula IIa

3-(3-aminopropyl)-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.2.

Example 4:

- 5 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa



- 10 cleavage of the Fmoc protecting group and reaction with 3,4,5-trimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

- 15 with R' = 3-Cl in formula IIa  
3-(3-aminopropyl)-6-chloro-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

- 20 with R' = 3-CH<sub>3</sub> in formula IIa  
3-(3-aminopropyl)-6-methyl-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

- 25 with R' = 4-Cl in formula IIa  
3-(3-aminopropyl)-7-chloro-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

- 30 with R' = 3-OCH<sub>3</sub> in formula IIa  
3-(3-aminopropyl)-6-methoxy-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with R' = H in formula IIa

3-(3-aminopropyl)-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one.

- 5 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3,4-dimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

- 10 with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

15

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

- 20 3-(3-aminopropyl)-6-methoxy-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

with R' = H in formula IIa

3-(3-aminopropyl)-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one.

25

Example 5:

- Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with [2,2']bithiophenyl-5-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained
- 30

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 401.9 found: 402.0;

5

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 381.5 found: 382.1;

10

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 401.9 found: 402.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

15

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 397.5 found: 398.0;

with R' = H in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-3H-quinazolin-4-one;

20

MS calc.: 367.5 found: 368.1.

#### Example 6:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-furan-2-yl-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

25

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

30

MS calc.: 329.8 found: 330.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.2;

5

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 329.8 found: 330.1;

10

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 325.4 found: 326.2;

with R' = H in formula IIa

15

3-(3-aminopropyl)-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 295.3 found: 296.2.

#### Example 7:

20

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with cyclohexanecarbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

25

3-(3-aminopropyl)-6-chloro-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-cyclohexyl-3H-quinazolin-4-one;

30

MS calc.: 299.4 found: 300.2;





with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 337.4;

5

with R' = H in formula IIa

3-(3-aminopropyl)-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 307.4.

10

Example 9:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with biphenyl-4-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

15

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 369.5 found: 370.1;

25

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

with R' = H in formula IIa

**3-(3-aminopropyl)-2-biphenyl-4-yl-3H-quinazolin-4-one;**

MS calc.: 355.4 found: 356.1.

5

**Example 10:**

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with thiophene-3-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

**3-(3-aminopropyl)-2-thiophenyl-3-yl-6-chloro-3H-quinazolin-4-one;**

MS calc.: 319.8 found: 320.1;

15

with R' = 3-CH<sub>3</sub> in formula IIa

**3-(3-aminopropyl)-2-thiophenyl-3-yl-6-methyl-3H-quinazolin-4-one;**

MS calc.: 299.4 found: 300.1;

20

with R' = 4-Cl in formula IIa

**3-(3-aminopropyl)-2-thiophenyl-3-yl-7-chloro-3H-quinazolin-4-one:**

**MS** calc.: 319.8 found: 320.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

25

**3-(3-aminopropyl)-2-thiophenyl-3-yl-6-methoxy-3H-quinazolin-4-one:**

**MS** calc.: 315.4 found: 316.1;

with R' = H in formula IIa

**3-(3-aminopropyl)-2-thiophenyl-3-yl-3H-quinazolin-4-one;**

30

MS calc.: 285.4 found: 286.1.

5 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with thiophene-2-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.0;

10

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 299.4 found: 300.1;

15

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.0;

20

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 315.4 found: 316.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-3H-quinazolin-4-one;

25

MS calc.: 285.4 found: 286.1.

#### Example 11:

30 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with

naphthalene-2-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 5 3-(3-aminopropyl)-2-naphthalen-2-yl-6-chloro-3H-quinazolin-4-one;  
MS calc.: 363.9 found: 364.1;

with R' = 3-CH<sub>3</sub> in formula IIa

- 10 3-(3-aminopropyl)-2-naphthalen-2-yl-6-methyl-3H-quinazolin-4-one;  
MS calc.: 343.4 found: 344.1;

with R' = 4-Cl in formula IIa

- 15 3-(3-aminopropyl)-2-naphthalen-2-yl-7-chloro-3H-quinazolin-4-one;  
MS calc.: 363.9 found: 364.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

- 3-(3-aminopropyl)-2-naphthalen-2-yl-6-methoxy-3H-quinazolin-4-one;  
MS calc.: 359.4 found: 360.1;

with R' = H in formula IIa

- 20 3-(3-aminopropyl)-2-naphthalen-2-yl-3H-quinazolin-4-one;  
MS calc.: 329.4 found: 330.2.

- 25 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with naphthalene-1-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 30 3-(3-aminopropyl)-2-naphthalen-1-yl-6-chloro-3H-quinazolin-4-one;

- 56 -

MS calc.: 363.9;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-6-methyl-3H-quinazolin-4-one;

5 MS calc.: 343.4 found: 344.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-7-chloro-3H-quinazolin-4-one;

10 MS calc.: 363.9 found: 364.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 359.4 found: 361.1;

15 with R' = H in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-3H-quinazolin-4-one;

MS calc.: 329.4 found: 330.1.

Example 12:

20 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-phenyl-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

25 with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-styryl-6-chloro-3H-quinazolin-4-one;

MS calc.: 339.8 found: 340.2;

with R' = 3-CH<sub>3</sub> in formula IIa

30 3-(3-aminopropyl)-2-styryl-6-methyl-3H-quinazolin-4-one;

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MS calc.: 319.4 found: 320.2;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-styryl-7-chloro-3H-quinazolin-4-one;

5 MS calc.: 339.8 found: 340.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-styryl-6-methoxy-3H-quinazolin-4-one;

10 MS calc.: 335.4 found: 336.2;

with R' = H in formula IIa

3-(3-aminopropyl)-2-styryl-3H-quinazolin-4-one;

MS calc.: 305.4 found: 306.2.

15 Example 13:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with benzofuran-5-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

20

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 353.8 found: 354.1;

25 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 333.4 found: 334.1;

with R' = 4-Cl in formula IIa

30 3-(3-aminopropyl)-2-benzofuran-5-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 353.8 found: 354.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-6-methoxy-3H-quinazolin-4-one;

5 MS calc.: 349.4 found: 350.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-3H-quinazolin-4-one;

MS calc.: 319.4 found: 320.1.

10

Example 14:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(4-dimethylamino-phenyl)-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

15

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-chloro-3H-quinazolin-4-one;

20 MS calc.: 382.9 ;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methyl-3H-quinazolin-4-one;

25 MS calc.: 362.5;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-7-chloro-3H-quinazolin-4-one;

30 MS calc.: 382.9;



with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methoxy-3H-quinazolin-4-one;

5 MS calc.: 378.5;

with R' = H in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-3H-quinazolin-4-one;

10 MS calc.: 348.5.

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(2,5-dimethoxy-phenyl)-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-chloro-3H-quinazolin-4-one;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methyl-3H-quinazolin-4-one;

25 with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

30

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methoxy-3H-quinazolin-4-one;

with R' = H in formula IIa

5 3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-3H-quinazolin-4-one.

Example 15:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 2,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

15 3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

20 3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

25 3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

30 with R' = H in formula IIa

3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Suzuki reaction according to G.C. Fu et al., Angew. Chem. 1998, 110, 3586-3587:

5

1 gram of resin bound 3-(3-aminomethyl-cyclohexylmethyl)-2-(4-bromophenyl)-3H-quinazolin-4-one is suspended in 10 ml of 1,4-dioxane. The reaction is then treated with 1.62 mmol  $\text{Cs}_2\text{CO}_3$ , 1.62 mmol of 2,4-dimethoxyphenyl boronic acid and 10 mol% ( $[\text{Pd}_2(\text{dba})_3] + \text{P}(\text{tert-Bu})_3$ ). The reaction is then allowed to shake at 80° until conversion is complete. After cooling the reaction mixture, it is worked up as is customary.

10

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 3,5-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

15

with  $\text{R}' = 3\text{-Cl}$  in formula IIa

20

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

with  $\text{R}' = 3\text{-CH}_3$  in formula IIa

25

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

with  $\text{R}' = 4\text{-Cl}$  in formula IIa

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-4-one;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

5 with R' = H in formula IIa

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 5-bromo-thiophenyl-2-carbaldehyde, Suzuki-reaction with 3,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

15 3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

20 3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-7-chloro-3H-quinazolin-4-one;

25 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methoxy-3H-quinazolin-4-one;

30 with R' = H in formula IIa

3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-3H-quinazolin-4-one.

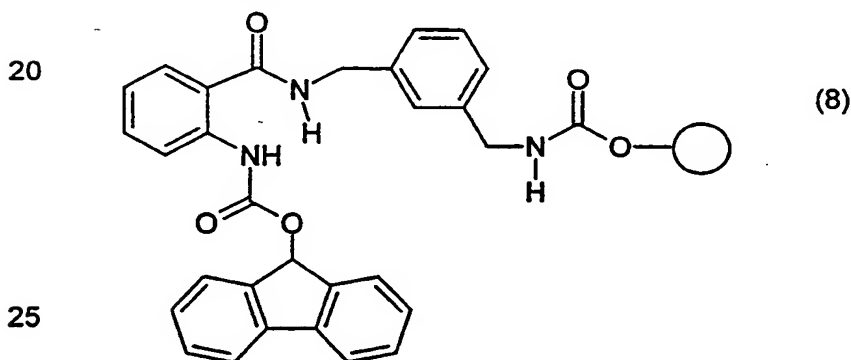
Example 16:

5     **1. Synthesis of Fmoc protected anthranilic acid**

29.15 mmol of anthranilic acid is taken in 100 ml of 1,4 dioxane then 145 mmol of sodium bicarbonate in 20 ml of water is added. Next, 32 mmol of Fmoc-Cl is added and the reaction is left to stir overnight at room temperature. The reaction is then concentrated in vacuo and customary worked up for solution reactions. The resulting solid is triturated in ethyl ether affording the pure product.

15     **2. Coupling of Fmoc protected anthranilic acid to resin**

1 gram of resin (3) is suspended in 10 ml of DMF. The reaction is then treated with 1.62 mmol of Fmoc protected anthranilic acid, 1.62 mmol of HBTU, and 1.62 mmol of triethyl amine. The reaction is then allowed to shake overnight at room temperature. After customary working up, the resin is dried in vacuo affording resin bound anthranilic acid (8).

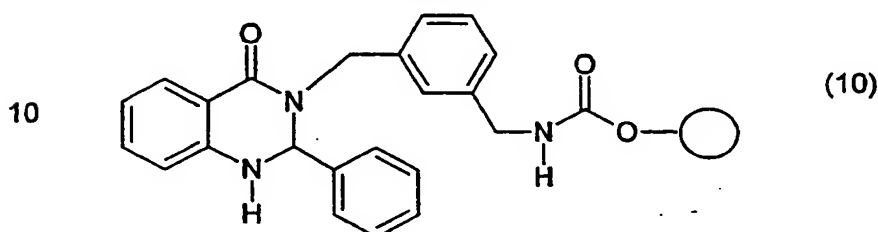


30     **3. Cleavage of Fmoc protected group**

1 gram resin (8) is suspended in 10 ml of 20% piperidine/DMF and shaken for 1.5 hours at room temperature. The reaction is then customary worked up for solid-phase reactions affording the free aniline (9).

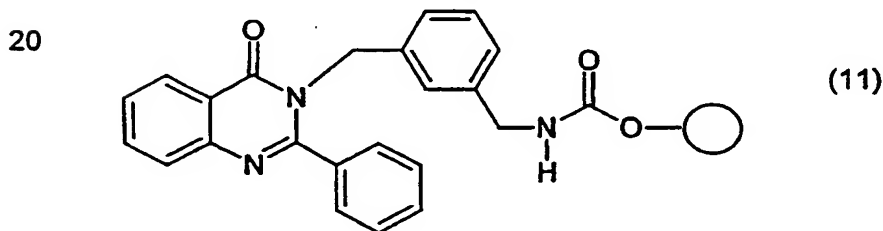
#### 4. Aldehyde condensation and ring closure

100 mg resin (9) is suspended in 1 ml of dimethyl acetamide then 200  $\mu$ l of acetic acid is added followed by the addition of 2.16 mmol of benzaldehyde. The reaction is then heated to 80° for two days. The reaction is then cooled to room temperature and customary worked up for solid-phase reactions affording the resin (10).



#### 5. Oxidation to quinazolinone

100 mg resin (10) is suspended in 4 ml solution of 36 mg of DDQ in DMF. Then the reaction is allowed to shake overnight at room temperature. The reaction is then customary worked up for solid-phase reactions affording quinazolinone (11) resin bound.



#### 6. Cleavage of the final product 3-(3-aminomethyl-benzyl)-2-phenyl-3H-quinazolin-4-one

100 mg of resin (11) is suspended in 2 ml of a 50% trifluoroacetic acid/methylene chloride solution and shaken for 1.5 hours at room

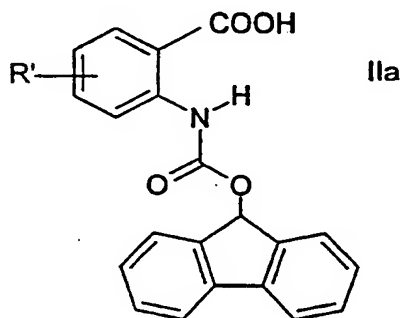
30

temperature. Customary working up for solid-phase reactions afforded 3-(3-aminomethyl-benzyl)-2-phenyl-3H-quinazolin-4-one;

MS calc.: 341.4 found: 342.1.

5 Example 17:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa



15 cleavage of the Fmoc protecting group and reaction with benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;

MS calc.: 375.9 found: 376.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-phenyl-3H-quinazolin-4-one;

25 MS calc.: 355.4 found: 356.1;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-phenyl-3H-quinazolin-4-one;

MS calc.: 375.9;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-phenyl-3H-quinazolin-4-one;

MS calc.: 371.4 found: 372.2.

- 5 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 2-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

- 10 with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

- 15 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.5 found: 370.2;

- 20 with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

- 25 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

- 30 with R' = H in formula IIa



3-(3-aminomethyl-benzyl)-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 355.4 found: 356.2.

- 5 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 10 3-(3-aminomethyl-benzyl)-6-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

with R' = 3-CH<sub>3</sub> in formula IIa

- 15 3-(3-aminomethyl-benzyl)-6-methyl-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.5 found: 370.2;

with R' = 4-Cl in formula IIa

- 20 3-(3-aminomethyl-benzyl)-7-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

- 25 3-(3-aminomethyl-benzyl)-6-methoxy-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

with R' = H in formula IIa

- 30 3-(3-aminomethyl-benzyl)-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 355.4 found: 356.1.

5 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

10 3-(3-aminomethyl-benzyl)-6-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

with R' = 3-CH<sub>3</sub> in formula IIa

15 3-(3-aminomethyl-benzyl)-6-methyl-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.5 found: 370.2;

with R' = 4-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-7-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

25 3-(3-aminomethyl-benzyl)-6-methoxy-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

with R' = H in formula IIa

30 3-(3-aminomethyl-benzyl)-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 355.4 found: 356.2.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-tert-butyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 432.0 found: 432.2;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 411.6 found: 412.2;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 432.0 found: 432.2;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 427.6 found: 428.2;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 397.5 found: 398.2.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-chloro-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

5

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 410.3 found: 410.1;

10

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

15

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 410.3 found: 410.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

20

3-(3-aminomethyl-benzyl)-6-methoxy-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 405.9 found: 406.1;

with R' = H in formula IIa

25

3-(3-aminomethyl-benzyl)-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 375.9 found: 376.1.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-

30

methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

5 3-(3-aminomethyl-benzyl)-6-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 405.9 found: 406.1;

with R' = 3-CH<sub>3</sub> in formula IIa

10 3-(3-aminomethyl-benzyl)-6-methyl-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

with R' = 4-Cl in formula IIa

15 3-(3-aminomethyl-benzyl)-7-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 405.9 found: 406.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

20 3-(3-aminomethyl-benzyl)-6-methoxy-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 401.5 found: 402.1;

with R' = H in formula IIa

25 3-(3-aminomethyl-benzyl)-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 371.4 found: 372.2.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-

30

methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 5 3-(3-aminomethyl-benzyl)-6-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;  
MS calc.: 405.9;

with R' = 3-CH<sub>3</sub> in formula IIa

- 10 3-(3-aminomethyl-benzyl)-6-methyl-2-(3-methoxyphenyl)-3H-quinazolin-4-one;  
MS calc.: 385.5;

with R' = 4-Cl in formula IIa

- 15 3-(3-aminomethyl-benzyl)-7-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;  
MS calc.: 405.9;

with R' = 3-OCH<sub>3</sub> in formula IIa

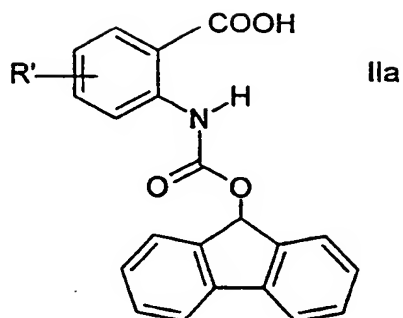
- 20 3-(3-aminomethyl-benzyl)-6-methoxy-2-(3-methoxyphenyl)-3H-quinazolin-4-one;  
MS calc.: 401.5;

with R' = H in formula IIa

- 25 3-(3-aminomethyl-benzyl)-2-(3-methoxyphenyl)-3H-quinazolin-4-one;  
MS calc.: 371.4.

Example 18:

- 30 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa



cleavage of the Fmoc protecting group and reaction with 3,4,5-trimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with  $R' = 3\text{-Cl}$  in formula 11a

3-(3-aminomethyl-benzyl)-6-chloro-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with  $R' = 3\text{-CH}_3$  in formula 11a

3-(3-aminomethyl-benzyl)-6-methyl-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with  $R' = 4\text{-Cl}$  in formula 11a

3-(3-aminomethyl-benzyl)-7-chloro-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with  $R' = 3\text{-OCH}_3$  in formula 11a

3-(3-aminomethyl-benzyl)-6-methoxy-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with  $R' = \text{H}$  in formula 11a

3-(3-aminomethyl-benzyl)-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3,4-dimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

5

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

10

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

15

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

20

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

25

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one.

Example 19:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with [2,2']bithiophenyl-5-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

30



with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 464.0 found: 464.0;

5

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 443.6 found: 444.1;

10

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 464.0 found: 464.0;

15

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 459.6 found: 460.1;

20

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-3H-quinazolin-4-one;

MS calc.: 429.6 found: 430.1.

25 Example 20:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-furan-2-yl-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 391.9 found: 392.2;

5

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 371.4 found: 372.2;

10

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 391.9 found: 392.1;

15

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 387.4 found: 388.2;

20

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 357.4 found: 358.2.

25

Example 21:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with cyclohexanecarbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

30

5

MS calc.: 381.9 found: 382.2:

**3-(3-aminomethyl-benzyl)-6-methyl-2-cyclohexyl-3H-quinazolin-4-one:**

MS calc.: 361.5 found: 362.3;

10

**3-(3-aminomethyl-benzyl)-7-chloro-2-cyclohexyl-3H-quinazolin-4-one;**

MS calc.: 381.9 found: 382.2:

15

**3-(3-aminomethyl-benzyl)-6-methoxy-2-cyclohexyl-3H-quinazolin-4-one;**

MS calc.: 377.5 found: 378.2:

20

**3-(3-aminomethyl-benzyl)-2-cyclohexyl-3H-quinazolin-4-one;**

MS calc.: 347.5 found: 348.2.

### Example 22:

25

30

**3-(3-aminomethyl-benzyl)-6-chloro-2-phenylethyl-3H-quinazolin-4-one;**

MS calc.: 403.9 found: 404.2;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 383.5 found: 384.3;

5 with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 403.9 found: 404.2;

with R' = 3-OCH<sub>3</sub> in formula IIa

10 3-(3-aminomethyl-benzyl)-6-methoxy-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 399.5 found: 400.3;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-phenylethyl-3H-quinazolin-4-one;

15 MS calc.: 369.5 found: 370.3.

Example 23:

Analogously to example 16, by reaction of resin (3) with a compound of  
formula IIa, cleavage of the Fmoc protecting group and reaction with  
20 biphenyl-4-carbaldehyde, oxidation and cleavage from the solid phase, the  
following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-6-chloro-3H-quinazolin-4-one;

25 MS calc.: 452.0 found: 452.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 431.5 found: 432.2;

30

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 452.0 found: 452.1;

5 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 447.5 found: 448.1;

with R' = H in formula IIa

10 3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-3H-quinazolin-4-one;

MS calc.: 417.5 found: 418.1.

Example 24:

15 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with thiophene-3-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-6-methyl-3H-quinazolin-4-one;

25 MS calc.: 361.5 found: 362.2;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.1;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 377.5;

5

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-3H-quinazolin-4-one;

MS calc.: 347.4 found: 348.2.

10

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with thiophene-2-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

15

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.0;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 361.5 found: 362.1;

25

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.0;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 377.5 found: 378.1;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-3H-quinazolin-4-one;

MS calc.: 347.4 found: 348.1.

5

Example 25:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with naphthalene-2-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

10

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 425.9 found: 426.1;

15

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 405.5 found: 406.1;

20

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 425.9 found: 426.1;

25

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 421.5 found: 422.2;

30

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-3H-quinazolin-4-one;

MS calc.: 391.5 found: 392.2.

5 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with naphthalene-1-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

10 3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-6-chloro-3H-quinazolin-4-one;  
MS calc.: 425.9 found: 426.1;

with R' = 3-CH<sub>3</sub> in formula IIa

15 3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-6-methyl-3H-quinazolin-4-one;  
MS calc.: 405.5 found: 406.1;

with R' = 4-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-7-chloro-3H-quinazolin-4-one;  
MS calc.: 425.9 found: 426.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

25 3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-6-methoxy-3H-quinazolin-4-one;  
MS calc.: 421.5 found: 422.1;

with R' = H in formula IIa

30 3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-3H-quinazolin-4-one;  
MS calc.: 391.5 found: 393.2.



Example 26:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-phenyl-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-6-chloro-3H-quinazolin-4-one;

MS calc.: 401.9 found: 402.2;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-6-methyl-3H-quinazolin-4-one;

MS calc.: 381.5 found: 382.2;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-7-chloro-3H-quinazolin-4-one;

MS calc.: 401.9 found: 403.2;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 397.5 found: 398.2;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-3H-quinazolin-4-one;

MS calc.: 367.5 found: 368.2.

Example 27:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with

benzofuran-5-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 5     3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-6-chloro-3H-quinazolin-4-one;  
MS     calc.: 415.9 found: 416.1;

with R' = 3-CH<sub>3</sub> in formula IIa

- 10     3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-6-methyl-3H-quinazolin-4-one;  
MS     calc.: 395.5 found: 396.1;

with R' = 4-Cl in formula IIa

- 15     3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-7-chloro-3H-quinazolin-4-one;  
MS     calc.: 415.9 found: 416.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

- 20     3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-6-methoxy-3H-quinazolin-4-one;  
MS     calc.: 411.5 found: 412.2;

with R' = H in formula IIa

- 25     3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-3H-quinazolin-4-one;  
MS     calc.: 381.4 found: 382.1.

25     Example 28:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(4-dimethylamino-phenyl)-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-chloro-3H-quinazolin-4-one;

MS calc.: 445.0 found: 445.2;

5

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methyl-3H-quinazolin-4-one;

MS calc.: 424.6 ;

10

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-7-chloro-3H-quinazolin-4-one;

MS calc.: 445.0 found: 445.1;

15

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methoxy-3H-quinazolin-4-one;

MS calc.: 440.5;

20

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-3H-quinazolin-4-one;

MS calc.: 410.5.

25

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(2,5-dimethoxy-phenyl)-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-chloro-3H-quinazolin-4-one;

5 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

10 3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

15 3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methoxy-3H-quinazolin-4-one;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-3H-quinazolin-4-one.

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Example 29:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 2,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

25

with R' = 3-Cl in formula IIa

30 3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

5

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-4-one;

10

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

15

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Suzuki reaction according to G.C. Fu et al., Angew. Chem. 1998, 110, 3586-3587:

20

1 gram of resin bound 3-(3-aminomethyl-cyclohexylmethyl)-2-(4-bromophenyl)-3H-quinazolin-4-one is suspended in 10 ml of 1,4-dioxane. The reaction is then treated with 1.62 mmol Cs<sub>2</sub>CO<sub>3</sub>, 1.62 mmol of 2,4-dimethoxyphenyl boronic acid and 10 mol% ([Pd<sub>2</sub>(dba)<sub>3</sub>] + P(tert-Bu)<sub>3</sub>). The reaction is then allowed to shake at 80° until conversion is complete. After cooling the reaction mixture, it is worked up as is customary.

25

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 3,5-dimethoxyphenyl boronic

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acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

- 5 3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

- 10 3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

- 15 3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

- 20 3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

with R' = H in formula IIa

- 25 3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 5-bromo-thiophenyl-2-carbaldehyde, Suzuki-reaction with 3,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

- 30 with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

5 3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

10 3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

15 3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methoxy-3H-quinazolin-4-one;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-3H-quinazolin-4-one.

20 The following examples relate to pharmaceutical preparations:

**Example A: Injection vials**

25 A solution of 100 g of an active compound of the formula I and 5 g of disodium hydrogenphosphate is adjusted to pH 6.5 in 3 l of double-distilled water using 2N hydrochloric acid, sterile-filtered, dispensed into injection vials, lyophilized under sterile conditions and aseptically sealed. Each injection vial contains 5 mg of active compound.

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2 kg of active compound of the formula I are dispensed into hard gelatin capsules in a customary manner such that each capsule contains 20 mg of the active compound.



**Example H: Ampules**

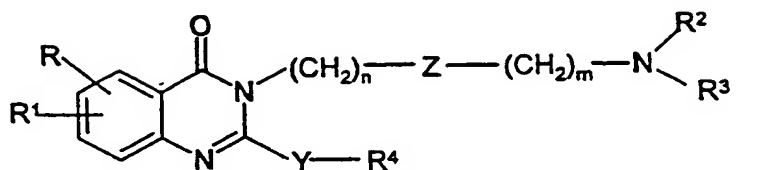
A solution of 1 kg of active compound of the formula I in 60 ml of double-distilled water is sterile-filtered, dispensed into ampules, lyophilized under sterile conditions and aseptically sealed. Each ampule contains 10 mg of active compound.

The preceding examples can be repeated with similar success by substituting the generically or specifically described reactants and/or operating conditions of this invention for those used in the preceding examples.

From the foregoing description, one skilled in the art can easily ascertain the essential characteristics of this invention, and without departing from the spirit and scope thereof, can make various changes and modifications of the invention to adapt it to various usages and conditions.

What is claimed is:

1. A compound of formula I



in which

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,

R<sup>4</sup> is Ar, phenylalkyl, cycloalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

Z may be absent and, if present, is phenylene,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Hal is F, Cl, Br or I,

n and m are each independently 0, 1, 2 or 3 and the sum of n and m is greater than 0,

with the proviso if Z and Y are absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,

and

if Z and Y are absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl, R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,

or a pharmaceutically acceptable salt or solvate thereof.

2. A compound of formula I according to Claim 1

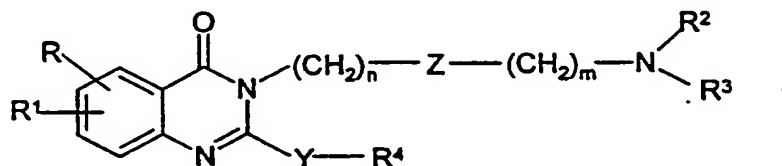
a) 3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-methoxy-3H-quinazolin-4-one,

b) 3-(3-aminomethyl-propyl)-2-[2,2']bithiophenyl-5-yl-6-chloro-3H-quinazolin-4-one,

c) 3-(3-aminomethyl-propyl)-2-[2,2']bithiophenyl-5-yl-7-chloro-3H-quinazolin-4-one,

or a pharmaceutically acceptable salt or solvate thereof.

3. A process for the preparation of a compound of formula I



in which

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,

R<sup>4</sup> is Ar, phenylalkyl, cycloalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

Z may be absent and, if present, is phenylene,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

Ar is ph nyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Hal is F, Cl, Br or I,

n and m are each independently 0, 1, 2 or 3 and the sum of n and m is greater than 0,

with the proviso if Z and Y are absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,

and

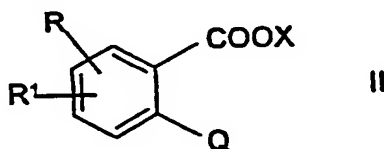
if Z and Y are absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl, R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,

or a pharmaceutically acceptable salt or solvate thereof comprising

a) treating a compound of formula I with a solvolysing or hydrogenolysing agent in order to liberate it from one of its functional derivatives,

or

b) reacting a compound of formula II

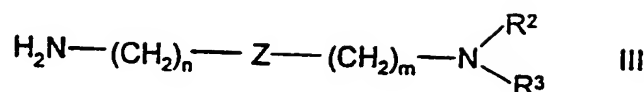


in which

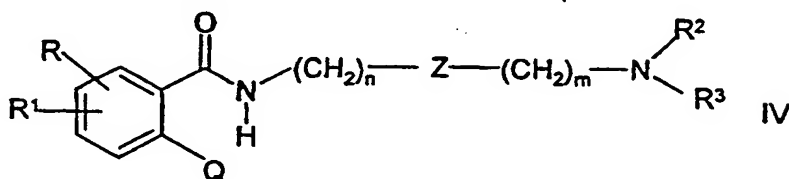
X is Cl, Br, OH or a reactive esterified OH group and

Q is NH<sub>2</sub>, NHA or a protected amino group,

with a compound of formula III



in which  $\text{R}^2$ ,  $\text{R}^3$ ,  $n$  and  $m$  have the meanings indicated in Claim 1,  
to give a compound of formula IV



and

deprotecting a compound of formula IV as indicated above, if necessary, to give  
a compound of formula IV in which  $\text{Q}$  is  $\text{NH}_2$  or  $\text{NHA}$ , and reacting said compound of  
formula IV in which  $\text{Q}$  is  $\text{NH}_2$  or  $\text{NHA}$  with a compound of formula V

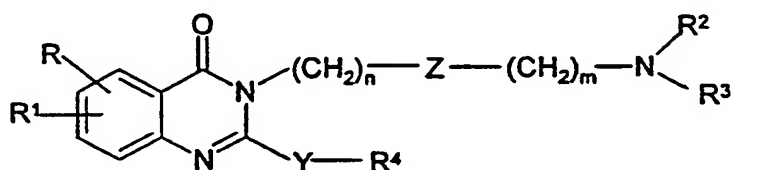


in which  $\text{R}^4$  and  $\text{Y}$  have the meanings indicated in Claim 1,  
or

- c) converting a radical  $\text{R}$ ,  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$  and/or  $\text{R}^4$  into another radical  $\text{R}$ ,  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$  and/or  $\text{R}^4$  by
- converting an amino group into a guanidino group by reaction with an amidinating agent,
  - reducing a nitro group, sulfonyl group or sulfoxyl group,
  - etherifying an  $\text{OH}$  group or subjecting an  $\text{OA}$  group to ether cleavage,
  - alkylating a primary or secondary amino group,
  - partially or completely hydrolysing a  $\text{CN}$  group,
  - cleaving an ester group or esterifying a carboxylic acid radical,

- reacting an aryl bromide, aryl iodide, heteroaryl bromide or heteroaryliodide to give the corresponding coupling products by means of a Suzuki coupling with boronic acids,
  - or carrying out a nucleophilic or electrophilic substitution,
- and/or
- (e) converting a base or acid of formula I into one of its salts or solvates.

4. A compound of formula I



in which

- R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,
- R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase,
- R<sup>4</sup> is Ar, phenylalkyl, cycloalkyl or Het,
- Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,
- Z may be absent and, if present, is phenylene,
- A is unbranched or branched alkyl having 1 to 6 carbon atoms,
- Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,
- Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Hal is F, Cl, Br or I,

n is 0, 1, 2 or 3, and

m is 0, 1, 2 or 3,

or a pharmaceutically acceptable salt or solvate thereof.

5. A pharmaceutical composition comprising a compound of Claim 4 or a pharmaceutically acceptable salt or solvate thereof and a pharmaceutically acceptable carrier.

6. A glycoprotein 1bIX antagonist, comprising a compound of Claim 4 or a pharmaceutically acceptable salt or solvate thereof, and a pharmaceutically acceptable carrier.

7. A glycoprotein 1bIX antagonist of Claim 6, for the control of thrombotic disorders and/or sequelae deriving therefrom.

8. A pharmaceutical composition comprising two or more compounds according to Claim 4 and/or pharmaceutically acceptable salts or solvates thereof, and a pharmaceutically acceptable carrier.

9. A method for treating or preventing a thrombotic disorder or sequelae deriving therefrom, comprising administering to a patient in need of such treatment an effective amount of a compound of Claim 4.

10. A method for achieving an antiadhesive effect, comprising administering to a patient in need of such treatment an effective amount of a compound of Claim 4.

11. A method for treating or preventing myocardial infarct, arteriosclerosis, angina pectoris, acute coronary syndrome, peripheral circulatory disorder, stroke, transient ischaemic attack, or reocclusion or restenosis after angioplasty or stent implantation, comprising administering to a patient in need of such treatment an effective amount of a compound of Claim 4.

**התאחדות העובדים**



$$\text{R}^1\text{---}\text{C}_6\text{H}_3\text{---}\text{N}(\text{R}^2)(\text{R}^3)\text{---}(\text{CH}_2)_m\text{---}\text{Z}\text{---}(\text{CH}_2)_n\text{---}\text{N}(\text{R}^4)(\text{R}^5)\text{---}\text{C}(=\text{O})\text{---}\text{C}_6\text{H}_3\text{---}\text{R}^6$$

R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, Y, Z, n and m have the meaning indicated in Patent Claim 1, and their salts or solvates as glycoprotein IbIX antagonists.

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